Bound Pronoun Licensing

Tsukuba English Studies (1990) vol.9, 295-326

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0. Introduction

In previous studies of pronouns and their antecedents, it has been noticed that coreferential and bound pronouns are partly different in distribution. The well-known paradigm is as follows:

(1) a. John$_i$ loves his$_i$ mother
    b. His$_i$ mother loves John$_i$
    c. *He$_i$ loves John$_i$
(2) a. Who$_i$ loves his$_i$ mother
    b. *Who$_i$ does his$_i$ mother love
    c. *Who$_i$ does he$_i$ love
(3) a. Everyone$_i$ loves his$_i$ mother
    b. *His$_i$ mother loves everyone$_i$
    c. *He$_i$ loves everyone$_i$

(1c), (2c) and (3c) have traditionally been treated as violations of Condition C of the binding theory, inducing strong crossover effects. What interests us is the contrast between (1b) on one hand and (2b) and (3b) on the other. This contrast is due to the so-called weak crossover effect. In (1b), the pronoun *his* does not c-command *John* and no violation of Condition C occurs. We might expect (2b) and (3b) to be grammatical, too, because the pronoun *his* in each sentence does not c-command the trace which the quantified phrase left in LF. But the sentences are ungrammatical. Consider (4), the LF representations of (2b) and (3b):

(4) a. [who$_i$ does [his$_i$ mother love t_i]]
    b. [everyone$_i$ [his$_i$ mother loves t_i]]

To capture these phenomena, various constraints have been

proposed: the Leftness Condition in Chomsky (1976), which was originally proposed by Postal (1970, 1971), the c-command requirement suggested in Reinhart (1976, 1983) and Higginbotham (1980, 1983), the Bijection Principle in Koopman and Sportiche (1982), the Parallelism Constraint on Operator Binding by Safir (1984), and so forth.

Reinhart(1976, 1983) posits the following condition on antecedents of bound pronouns.

(5) Quantified NPs and *wh*-traces can have anaphoric relations only with pronouns in their c-command syntactic domain.

The constraint in (5) accounts for the difference in grammaticality between (2a) and (3a) on one hand and (2b) and (3b) on the other. Reinhart assumes that (5) applies at S-structure. But it immediately faces the following sentence, which contains a pronoun that is not c-commanded by a quantified NP and is nevertheless grammatical.

(6) Some barber in every city$_i$ hates it$_i$

In addition, Stowell (1987) presents adjunct/argument asymmetries with respect to the bound variable interpretation of the sentences which involve violations of (5).

(7) a. Which man$_i$ did Mary dislike t$_i$ [even before she had met him$_i$]
b. What$_i$ did the teacher try to buy t$_i$ [without testing it$_i$ first]
c. Paul Mason sells no wine$_i$ [before its$_i$ time]
d. John greeted every doctor$_i$ [after she$_i$ arrived at the airport] (Stowell (1987))

In this paper, I propose that a pronoun should be c-

commanded by a quantified phrase at LF to be licensed as a bound pronoun. Before presenting the licensing condition itself, we will examine the analysis by Stowell(1987) and point out two problems in section 1; one is empirical and the other is theory-internal. In section 2, I will posit the licensing condition and discuss how it covers the relevant data. In section 3, I will deal with Scrambling and empty pronominals with the bound variable interpretation in Japanese.

1. Stowell's (1987) Analysis

1.1 Argument/Adjunct Asymmetry

Stowell points out an asymmetry between arguments and adjuncts with respect to the bound variable interpretation, which cannot be explained by (5). Let us observe the sentences in (7) and compare them with (2b) and (3b) repeated here.[1]

(7) a. Which man$_i$ did Mary dislike t_i [even before she had met him$_i$]
b. What$_i$ did the teacher try to buy t_i [without testing it$_i$ first]
c. Paul Mason sells no wine$_i$ [before its$_i$ time]
d. John greeted every doctor$_i$ [after she$_i$ arrived at the airport] (Stowell(1987))

(2) b. *Who$_i$ does his$_i$ mother love
(3) b. *His$_i$ mother loves everyone$_i$

In (7) *wh*-traces and quantified NPs do not c-command the pronouns in the adjunct phrases as those in (2) and (3) do not. (5) predicts that the sentences in (7), (2) and (3) are all ungrammatical, but only those pronouns contained in argument NPs are subject to the condition in (5): the pronouns contained in adjunct phrases seem to be free from the condition in (5).

One might argue that if we define c-command in a looser sense, then the contrast between pronouns in argument phrases and those in adjunct phrases could be captured. Stowell presents evidence against the claim that pronouns in adjunct phrases in (7) are licensed by the variables in the object position because the adjunct phrases in (7) are all VP-internal.

(8) a. Which man$_i$, even before talking to him$_i$, did you decide that you dislike t$_i$
b. Who$_i$, despite his$_i$ having helped you, did you gossip about t$_i$

(9) a. Who$_i$ did Mary say [t$_i$ was a fool][after staying with him$_i$]
b. Which boy$_i$ did some girl believe [t$_i$ be a fool] [after staying with him$_i$] (Stowell(1987))

Although it is not clear where the adjunct phrases in (8) are located, pronouns contained in these phrases are not c-commanded by the traces, and still the sentences are grammatical. In (9) the *wh*-phrases originate from the lower clauses and hence the traces left by *wh*-movement cannot c-command the pronouns. The sentences in (9) are also grammatical, contrary to the prediction made by (5). So we can no longer maintain (5) as it stands.[2]

In the next subsection, we will discuss the idea suggested by Stowell, which seens to be basically on the right track.

1.2 The Mechanism of Slash-Indexing and Condition C Effects

Let us begin by considering the mechanism of slash-indexing adopted in Stowell(1987). Stowell states the mechanism informally as follows:

(10) ...an XP under the scope of QP acquires the index of QP if it contains a variable bound by QP.

The underlying intuition is that if some element is referentially dependent on other elements, it acquires the indices of the latter as slash-indices. Consider the following examples.

(11) a. [Some barber in every city$_i$] hates it$_i$
b. [$_{NP1}$ Every city$_i$][$_{NP2}$ some barber in t$_i$]$_{j/i}$ t$_{j/i}$ hates it$_i$

(11b) is the LF representation of (11a) with intrinsic and slash-indices. *Every city* undergoes Quantifier Raising (henceforth QR) at LF and takes scope at the IP-adjoined position. Since NP$_2$ contains a variable bound by a QP which takes scope over NP$_2$, it obtains the slash-index *j* according to the mechanism in (10).

Stowell argues that a typical example which exhibits weak crossover effects has such a structure as in (12b) at LF, in which an NP with a slash-index *i* c-commands a variable bearing the same intrinsic index as the slash-index.

(12) a. *Who$_i$ does his$_i$ boss dislike t$_i$
b. Who$_i$ does [[his$_i$ boss]$_{j/i}$ dislike t$_i$]

The ungrammaticality of (12a) is, according to Stowell's analysis, attributed to a violation of Condition C of the binding theory. That is, the variable in the object position is illegally A-bound by the slash-index *i* on the subject NP *his boss*. Why, then, can the pronouns in the adjuncts in (7)-(9) escape from this condition? The answer is simple. Recall that the binding theory regulates a relation between elements in A-positions. Adjuncts do not stand in A-positions and therefore they cannot be a potential A-binder even if they bear the same slash-indices as the intrinsic indices of variables. Let us observe the LF representation below.

(13) What$_i$ did John file t$_i$ [before reading it$_i$]$_{j/i}$

In (13) an adjunct phrase with a slash-index *i* which c-commands the trace left by *what* never triggers a Condition C violation since it is not an A-binder. The grammaticality of (7)-(9) is accounted for in the same way.

Thus Stowell attributed the argument/adjunct asymmetry to a violation of an independently motivated principle, by incorporating the mechanism of slash-indexing into the binding theory. Though Stowell mentions nothing about how bound pronouns are licensed, I will suggest that a licensing condition should be necessary to cover the problems which will be observed in the next subsection.

1.3 Problems

There are two problems in Stowell's analysis: one is empirical and the other is theory-internal. First we examine the empirical problem. If Stowell's analysis is correct and only the argument/adjunct distinction is relevant, the following (14b), (15b) and (16b) will be expected to be grammatical analogously to (7)-(9), contrary to fact.

(14) a. [Every worker over 60]$_i$ had to resign in order to receive his$_i$ insurance

b. *We had to fire [every worker over 60]$_i$ in order to pay his$_i$ insurance

b. We sent [every worker over 60]$_i$ home to live on his$_i$ insurance

(15) a. Near his$_i$ child's crib nobody$_i$ would keep matches

b. *Near his$_i$ child's crib you should give nobody$_i$ matches

c. You should give nobody$_i$ matches near his$_i$ child's crib

(16) a. Thinking about his$_i$ problem, everyone$_i$ got depressed
b. *Thinking about his$_i$ problem, I pitied everyone$_i$
c. I pitied everyone$_i$, thinking about his$_i$ problem (Reinhart(1983))

(14)-(16) are presented by Reinhart to support her claim that c-command (m-command) by variables is indispensable for pronouns to be given a bound variable interpretation. (14)-(16) pose a problem if one want to maintain Stowell's line of approach, since pronouns in the adjunct phrases cannot be interpreted as bound, contrary to prediction.

The second problem is a theory-internal one. If we take it seriously that slash-indexing enters into the binding theory, it is natural to assume that it also plays a role in Condition A and Condition B. But the fact is that only Condition C is sensitive to slash-indexing. Recall the example in (11).

(11) a. [Some barber in every city$_i$] hates it$_i$
b. [$_{NP1}$ Every city$_i$][$_{NP2}$ some barber in t$_i$]$_{j/i}$ t$_{j/i}$ hates it$_i$

Although it$_i$ is A-bound by the slash-index /i on t$_j$ in its governing category in (11b), the sentence is not ruled out by Condition B. Hence it must be assured that slash-indexing is only partially relevant to the binding theory. This, however, immediately raises the question why only condition C can refers to slash-indices.

Furthermore, epithets bound by operators cast doubt on the plausibility of the relation between Condition C and slash-indexing. Before examining relevant data, let us consider the behavior of epithets with respect to the binding theory. In this regard, Lasnik (1976) observes the following:

(17) An anaphoric epithet may be coreferential with a non-c-commanding NP, and may be bound by a c-commanding NP in an A'-position.

(17) can be verified by the following examples.

(18) a. John$_i$'s mother thinks [the little idiot]$_i$ is handsome
b. John$_i$, I really wonder if Mary likes [the little idiot]$_i$
(cf. John$_i$, I really wonder if Mary likes him$_i$)
c. *John$_i$ thinks [the little idiot]$_i$ is handsome

As the ungrammaticality of (18c) suggests, epithets are subject to Condition C, just as R-expressions are. With this in mind, let us consider the paradigm in (19).

(19) a. *[Every senator]$_i$ praised [the damn crook]$_i$
b. [An aide to [every senator]$_i$ praised [the damn crook]$_i$ at the conversation
(Hornstein & Weinberg (1987))

(19a) is ruled out by Condition C, since *the damn crook* is illegally A-bound by the subject NP. The crucial example is (19b). *The damn crook* in (19b) is interpreted as a bound anaphor whose referential value varies in the range restricted by the operator. Let us examine (20), the LF representation of (19b) with slash-indexing.

(20) [every senator]$_i$[an aide to t_i]$_{j/i}$ [$t_{j/i}$ praised [the damn crook]$_i$ ...]

If we assume that anaphoric epithets are restricted by Condition C, Stowell's analysis predicts that (19b) cannot have a bound reading of the epithet because $t_{j/i}$ c-commands the epithet in (20), leading to a Condition C violation.

This prediction, however, is incorrect. Again, this casts doubt on the analysis that attributes weak crossover effects to a violation of Condition C of the binding theory.

2. A Condition on Bound Pronouns

2.1 The Licensing Condition and Its Coverage

In this subsection, we will develop a way to give an explanation of the first problem, namely the problem with bound pronouns in adjunct phrases, which is beyond Stowell's analysis. We posit (21) as a licensing condition on bound pronouns.

(21) A pronoun is licensed as a bound pronoun iff it is c-commanded by QP at LF.

(21) may appear to be similar to Reinhart's condition but differs from it in the level where licensing takes place and in that (21) does not refer to *wh*-traces but to QPs including *wh*-phrases, unlike Reinhart's condition. In addition, we will make a stipulation in (22) about QR in LF.

(22) QR adjoins a QP to an immediate adjunction site.

This might be related to the clause-boundedness of QR. In the case of English, an immediate adjunction site for a QP in an object position is VP while that for a QP in a subject position is IP. In (23), for example,

(23) a. John loves everyone
b. John [$_{VP}$ everyone$_i$ [$_{VP}$ loves t$_i$]]
c. for every x, x a person, John loves x

everyone is adjoined to VP through QR in LF, as shown in (23b), and its absolute scope is the whole sentence as indicated in (23c). It should be stressed here that the scope which QP takes is different from the domain in which

QP licenses bound pronouns. Consider the following:

(24) a. His mother loves everyone
b. His mother [$_{VP}$ everyone$_i$ [$_{VP}$ loves t_i]]
c. for every x, x a person, His mother loves x
d. for every x, x a person x's mother loves x

(24b) is the LF representation of (24a). The semantic representation of (24a) is shown by (24c), but not by (24d). This means that *everyone* cannot license the bound pronoun at the VP-adjoined position, although the absolute scope of *everyone* is the whole sentence, as seen in (23).

Now (11b) and (20) need some consideration.

(11) b. [$_{QP1}$ Every city$_i$][$_{QP2}$ some barber in t_i]$_{j/i}$ $t_{j/i}$ hates it$_i$

(20) [$_{QP1}$ every senator]$_i$[$_{QP2}$ an aide to t_i]$_{j/i}$ [$t_{j/i}$ praised [the damn crook]$_i$ ...]

In (11b) and (20) QP_1s contained in QP_2s are adjoined not to immediate adjunction sites but to somewhere beyond QP_2s, when QP_1s take wide scope. This might appear to be contrary to (22). Note however that in (11b) and (20), the QPs in question are contained in other QPs, namely QP_2s. We claim that in these configurations, QP_1 can be adjoined to the position over QP_2 with the help of quantificational force of QP_2.

With these assumptions in mind, let us go back to the sentences in question. Recall that (3b) (repeated here as (25a)) is ruled out due to the unavailability of the bound variable interpretation, while (15b) (repeated here as (25b)) is predicted to be grammatical in stowell's analysis

(25) a. *His mother loves everyone (=(3b))
b. *Near his child's crib you should give nobody matches (=(15b))

We now examine the LF representations of (25):

(26) a. His$_i$ mother [$_{VP}$ everyone$_i$ [$_{VP}$ loves t$_i$]]
b. Near his$_i$ child' crib you should [$_{VP}$ nobody$_i$ [$_{VP}$ give t$_i$ matches]]

In each representation the object QP is adjoined to VP via QR, and the result is that the pronoun *his* cannot be c-commanded by the QP at LF and hence cannot be licensed as a bound pronoun, leading to the ungrammaticality. Consider further the following examples:

(27) a. *Every soldier kissed someone$_i$ if she$_i$ said hello
b. *Every soldier loves a gun$_i$ because it$_i$ never jams
c. *John likes every dog$_i$ and Sam feeds it$_i$
(Hornstein (1984))

It is generally said that the adjunct phrases in (27a,b) are adjoined to a higher position than VP. If so, the sentences in (27) are treated analogously; that is, the pronouns cannot be licensed as a bound pronoun, because no c-command relation holds between the QPs and the pronouns after QR in LF.[3]

One may wonder how, then, the bound pronouns are licensed in (4) and (5), repeated here:

(4) a. Which man, even before talking to him$_i$, did you decide that you dislike t$_i$
b. Who$_i$, despite his$_i$ having helped you, did you gossip about t$_i$

(5) a. Who$_i$ did Mary say [t$_i$ was a fool] [after staying with him$_i$]

b. Which boy$_i$ did some girl believe [t$_i$ be a fool] [after staying with him$_i$]

What is salient is that *wh*-movement is involved in (4) and (5). This makes a crucial difference between (27) on the one hand and (4) and (5) on the other. In (4) and (5) QPs (namely *wh*-phrases) which should license bound pronouns take scope over the whole sentence, and c-command the pronouns at S-structure. This means that they also satisfy the licensing condition in (21). Thus we can give an answer to the contrast with no extra stipulation.

One prediction follows as a consequence. If *wh*-movement, whether at S-structure or at LF, occurs and the moved *wh*-element takes scope over the pronoun, the sentence is predicted to be grammatical in our analysis. This prediction is borne out as exemplified in (28).

(28) Who proved which employer$_i$ to be competent after hiring him$_i$ (Abe (1990))

2.2 Slash-Indexing and the Binding Theory

In this subsection we discuss the second problem pointed out in 1.3. In 1.3 we observed that anaphoric epithets behave differently from R-expressions with respect to slash-indices. Rather they behave like pronouns. Compare (29a) and (29b) on one hand and (29c) on the other.

(29) a. Everyone's mother loves him
b. An aide to every senator praised the damn crook
c. *Who does his mother love

The LF representations of (29) are as follows.

(30) a. [$_{IP}$ everyone$_i$ [$_{IP}$ [t$_i$ mother]$_{j/i}$ loves him$_i$]]

b. [IP [every senator]i [IP [an aide to ti]j// praised [the damn crook]i]]

c. [CP whoi does [IP [hisi mother]j// love ti]]

In (30) the pronoun , the epithet and the variable are c-commanded by elements bearing a slash-index. Since the distribution of epithets is restricted by condition C, we expect (30b) to be ungrammatical like (30c). As we saw, this prediction cannot be borne out. If there exists a discrepancy between R-expressions and epithets with respect to Condition C triggered by a slash-index, we are forced to ask what makes (29c) ungrammatical.

Now let us examine the binding theory from a different view point. Lasnik (1986) introduces the feature [+ r] (R-Expressions) to differentiate anaphoric epithets from pure R-expressions, on the basis of data from English, Vietnamese and Thai.[4]

Interestingly, an R-expression need not be completely A-free in Vietnamese and Thai. Observe the following sentences.

#Thai

(31) a. cɔɔn khít wâa cɔɔn chàlàat
John thinks that John is smart

b. cɔɔn chɔɔp cɔɔn
John likes John

(32) a. cɔɔn khít wâa ?âybâa chàlàat
John thinks that the nut is smart

b. *cɔɔn chɔɔp ?âybâa
John likes the nut

#Vietnamese

(33) a. John tin John se thang
John thinks John will win

b. *John thuong John
John likes John

(34) a. John tin thang cho de se thang
John believes the son of a bitch will win
b. *John thuong cai thang cho de
John likes the son of a bitch

Thai and Vietnamese are not completely parallel in that an R-expression need not be free even in a minimal clause in Thai as in (31b), while it must be free in a minimal clause in Vietnamese as can be seen in (33b).

Note that R-expressions and anaphoric epithets behave differently in a minimal clause in Thai. In (31b) the R-expression *cɔɔn* is A-bound and still the sentence is grammatical, while in (32b) the epithet *?âʸbâa* is A-bound in a minimal clause and the sentence is ungrammatical. This fact suggests that anaphoric epithets have a pronoun-like character.

The difference between an R-expression and an epithet is further motivated by the following contrast as to A'-binding in English.

(35) a. John, I think the idiot should be fired
b.?*John, I think John should be fired
(Lasnik (1986))

To capture these differences between R-expressions and anaphoric epithets, Lasnik proposes the following feature system by adopting [± r].

(36) The Distinction of Nominal Elements by Lasnik (1986)

a.	[+a, +p, -r]	PRO
b.	[+a, -p, -r]	anaphors
c.	[-a, +p, -r]	pronouns
d.	[-a, -p, +r]	'pure' R-Expressions
e.	[-a, +p, +r]	anaphoric epithets

Notice that although both pure R-expressions and anaphoric epithets are [-a, +r], they differ in that the former type bears [- p] whereas the latter type bears [+ p].

Consider next the following Thai sentences.

(37) a. *khǎw khít wâa cɔɔn chàlàat
he thinks that John is smart

b. *khǎw khít wâa ?âybâa chàlàat
he thinks that the nut is smart

c. *?âybâa khít wâa cɔɔn chàlàat
the nut thinks that John is smart

Recall that in Thai R-expressions and epithets may be bound in structural configurations such as those in (37), as shown in (31a) and (32a). Nevertheless the sentences are ungrammatical. To explain the apparent paradox, Lasnik proposes a condition on binding which is completely independent of the binding conditions and refers to the relative degree of referentiality of a binder and a bindee.

(38) A less referential expression may not bind a more referential one.

(39) The Hierarchy of Referentiality
[+p, -r] < [+p, +r] < [-p, +r] (Lasnik (1986))
pronoun epithet R-expression

Now let us examine (37) again. In (37a) a pronoun binds an R-expression. In (37b) a pronoun binds an epithet. In (37c) an epithet binds an R-expression. In all cases, less referential expressions bind more referential ones, leading to violations of (38).

Bearing these considerations in mind, let us return to the problem raised by (30).

(30) a. [IP everyonei [IP [ti mother]j/i loves himi]]
b. [IP [every senator]i [IP [an aide to ti]j/i praised [the damn crook]i]]
c. [CP whoi does [IP [hisi mother]j/i love ti]]

Recall that we pointed out that an expected condition C effect induced by a slash-index cannot be found in (30b). Why is it the case? Now we can account for the paradigm in terms of (38), on the assumption in (40).

(40) Slash-indexed XP is as referential as [-a, +p, +r] element (that is, an epithet).

Note that (40) is not utterly *ad hoc* statement. Shinsuke Homma and Yuji Takano (personal communication) suggested to me that slash-indexed elements are similar to anaphoric epithets in that they are partly referential and partly dependent upon other elements for their reference.

Given (40), an epithet-like element binds a pronoun in (30a) and an epithet-like element binds an epithet in (30b). Thus no violation of (38) is caused. On the other hand, an epithet-like element binds a variable in (30c). That is, a less referential element binds a more referential element; hence the ungrammaticality of (30c).

Notice further that slash-indices on the elements in A'-positions do not induce a violation of (38) as in (13), repeated here.

(13) Whati did John file ti [before reading iti]j/i

This means that argument/adjunct asymmetry observed above is reduced to A/A' distinction of the binder.

We conclude that the effect in (30c) can be attributed to a violation of (38), based on the assumption in (40). This means that slash-indices have no bearing on the standard binding theory, namely , conditions A, B and C, but is related only to a fourth binding principle suggested by

Lasnik (1986), which differs from the binding conditions in that it refers to the referentiality of a binder and a bindee. This analysis is conceptually preferable to Stowell's explanation, since the latter has a burden to answer the question why Condition A and B do not refer to slash-indices while Condition C does.[5]

3. Crossover Phenomena in Japanese

3.1 Contrasts between Japanese and English

In the preceding section, I suggested that bound pronominals are licensed at LF in terms of c-command and coindexing. If licensing takes place at LF, we expect that the condition will also explain Japanese crossover phenomena. In this section we mainly discuss bound empty pronominals (so-called small pro) licensed by Scrambling and show that the discussion above provides an insight into the status of traces left by Scrambling.

Let us begin by observing the distribution of nominal elements in Japanese with respect to the binding theory.[6]

(41) a. John$_i$-ga John$_i$-no hahaoya-o aishiteiru
NOM GEN mother ACC love
"John loves John's mother"

b. John$_i$-ga sono hito$_i$-no/pro$_i$ hahaoya-o
the person GEN
aishiteiru
"John loves the person's/pro mother"

c. *sono hito$_i$-ga/pro$_i$ John$_i$-no hahaoya-o
aishiteiru
"The person/pro loves John's mother"

d. *sono hito$_i$-ga/pro$_i$ dare$_i$-o aishiteiru-no
who Q
"Whom does the person/pro love"

e. *sono hito$_i$-o/pro$_i$ dare$_i$-ga t$_i$ aishiteiru-no
"Who does the person/pro love"

Unlike English, R-expressions can be A-bound in Japanese, as is shown in (41a). Notice, however, that (38), a condition on the referential hierarchy, works even in Japanese; the less referential element *sono hito* c-commands the more referential element *John* in (41c) and hence it is ungrammatical.

Now (41d, e) need some consideration. The LF representations of (41d, e) are given below.

(42) a. [$_{CP}$ dare$_i$-o [$_{IP}$ sono hito$_i$-ga ti aishiteiru-no]]

b. [$_{CP}$ dare$_i$-o [$_{IP}$ t$_i$' [$_{IP}$ sono hito$_i$-ga t$_i$ aishiteiru-no]]

First, *sono hito* in (42) is c-commanded by QPs at LF but still they cannot be interpreted as bound pronouns and the sentences are ungrammatical. A standard explanation given to (41d, e) is that the traces left by Scrambleing is a variable and is bound by *sono hito* in A-position, leading to a violation of Condition C. But this explanation implicitly admits that there is a discrepancy, with respect to Condition C, between R-expressions and variables in Japanese, which is against the initial motivation to capture the distribution of R-expression and that of variables under the same condition, namely Condition C. This poses a theoretical problem on the binding theory.

Comparing the configurations of weak crossover and related constructions in English and the corresponding sentences in Japanese, we notice two differences. One is the behavior of pronouns in adjunct phrases. The other is the effect of slash-indexing. The former difference is exemplified in (43b).

(43) a. *[e$_j$ hitome sono hito$_i$-o / pro$_i$ mita]
one glance the person-ACC saw

hitoj-ga darei-o sukininatta-no
person-NOM who-ACC fell in love-Q
*Whoi did the person that took a glance at himi fell in love with?

b. *Kimi-wa [kaisha-ga sono hitoi-o / proi
-NOM company-NOM the person-ACC
kubi-ni shita ato-de] darei-o nagusameta-no
fired after who consoled -Q
Whoi did you console after the company had fired himi?

In (43b) the empty pronoun which is expected to be bound is in an adjunct phrase but the sentence is ungrammatical, which makes a clear contrast with the corresponding sentence in English. If it is correct to assume that the slash-indexing has something to do with the binding theory and that binding theory only regulates relations between A-positions, we cannot attribute the ungrammaticality of (43b) to (38), which accounts for typical weak crossover violations. This means that we need some other device to handle weak crossover violations in Japanese.

Interestingly enough, (43a, b) become grammatical if the QP in each sentence undergoes Scrambling at S-structure as in (44a, b).[7]

(44) a. darei-o [ej hitome sono hitoi-o/proi mita]
hitoj-ga ti sukininatta-no
b. darei-o John-ga [kaisha-ga sono hitoi-o/proi
kubi-ni shita atode] ti nagusameta-no

These examples are related to the second contrast between Japanese and English, to which we will return later.

Hoji (1985) argues that the examples with empty elements in (44) involve parasitic gaps, parallel to the English examples in (45).

(45) a. Who$_i$ did a picture of e$_i$ please t$_i$
b. What$_i$ did you read t$_i$ [without filing e$_i$]

The examples in (46), however, indicate that this claim is incorrect.

(46) a. kimi-wa dono hon$_i$-o [John-ga [e$_j$ e$_i$ kaita]
you TOP which book-ACC NOM wrote
hito$_j$-o otozureru maeni] t$_i$ yonda-no
person-ACC visit before read -Q
"Which book$_i$ did you read t$_i$ before John
visited the person who wrote it$_i$"
b. John-wa dono hon$_i$-o [[[Mary-ga [e$_j$ e$_i$
TOP which book-ACC NOM
kaita hito$_j$-o dou hometa -ka] kikazuni] t$_i$
wrote person how praised -Q without asking
hihanshita-no
criticized-Q
"Which book$_i$ did John criticize t$_i$ without
asking how Mary praised the person who wrote
it$_i$"

Here empty elements which should be regarded as parasitic according to Hoji's analysis are embedded in complex NP in (46a) and in complex NP and wh-island in (46b). If it is true that parasitic gap constructions cause island effects as in (47),

(47) a. *This is the man$_i$ John interviewed t$_i$ before
wondering who to ask which job to give to e$_i$
b. *This is the man$_i$ John interviewed t$_i$ before
reading the book you gave to e$_i$
(Chomsky (1986))

we expect (46) to be ruled out in a similar way to (47), contrary to fact. This fact leads us to conclude that empty

elements in (46) can be empty pronouns. Here we will explain the contrast between (43) and (44) without appealing to the parasitic gap construction.

The second difference between Japanese and English as to bound pronouns is concerned with (44), which involve the operation of Scrambling. That is: in Japanese slash-indexed elements does not induce the effect in (38) and (40), while the corresponding English elements do. Consider the following representations with slash-indices:

(48) a. dare$_i$-o [e$_j$ hitome sono hito$_i$-o/pro$_i$ mita]hito$_{j/i}$-ga t$_i$ sukini natta-no

b. dare$_i$-o John-ga [kaisha-ga sono hito$_i$-o/pro$_i$ kubini shita atode]$_{/j}$ t$_i$ nagusameta-no

(48b) presents no problem with respect to slash-indexing, since the slash-indexed element in (48b) is an adjunct phrase and it does not qualify as an A-binder. The problem is that the slash-indexed element in (48a) is an argument and qualifies as an A-binder, and nevertheless it does not cause a violation of the referential hierarchy observed in the corresponding structure (49) in English.

(49) OP$_i$ [[$_{NP}$ ...pronoun$_i$...]$_{j/i}$ V ... t$_i$ ....]

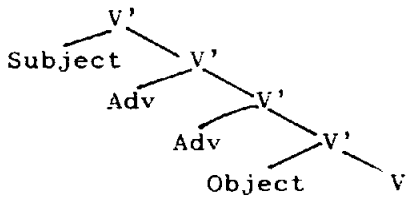
The key to the solution seems to lie in the difference between *wh*-movement and Scrambling.

In the next subsection, we will try to give an account of the contrasts between Japanese and English by considering the properties of traces left by Scrambling and the projection system in Japanese.

3.2 A Solution

First, we posit following Fukui (1986) that in Japanese there is no functional category and lexical categories project up only to X' level as in (50).

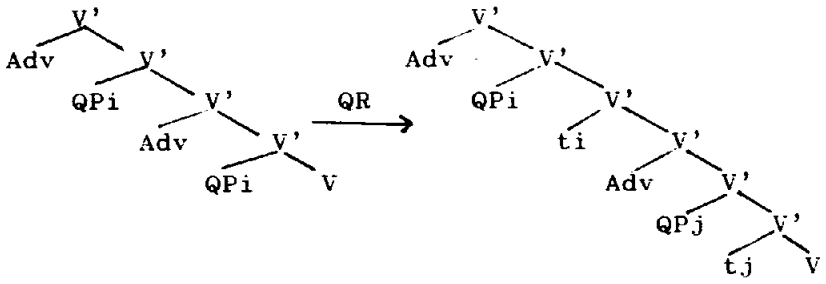
(50) Fukui's (1986) Projection System in Japanese



Furthermore we argue that QPs (including wh-phrases) undergo QR at LF as follows.[8]

(51) QR in Japanese

a. b.



Note that in (51) QPs are adjoined to the projections which immediately dominates them according to the assumption made in (22).

Now let us return to (43) and (44) repeated here for convenience.

(43) a. *[e_j hitome sono hito$_i$-o / pro$_i$ mita] hito$_j$-ga dare$_i$-o sukininatta-no
*Who$_i$ did the person that took a glance at him$_i$ fell in love with?

b. *Kimi-wa [kaisha-ga sono hito$_i$-o / pro$_i$ kubi-ni shita ato-de] dare$_i$-o nagusameta-no
Who$_i$ did you console after the company had fired him$_i$?

(44) a. dare$_i$-o [e$_j$ hitome sono hito$_i$-o/pro$_i$ mita]
hito$_j$-ga t$_i$ sukininatta-no
b. dare$_i$-o John-ga [kaisha-ga sono hito$_i$-o/pro$_i$
kubi-ni shita atode] t$_i$ nagusameta-no

(52) represents the LF-structures of (43).

(52) a. *[V' [NP ...pronoun$_i$ ...][V' QP$_i$ [V' t$_i$ V]]]
b. *[V' NP [V' [ADV ...pronoun$_i$ ...][V' QP$_i$
[V' t$_i$ V]]]]

In (52) QPs (namely, *wh*-phrase) are adjoined to V's which immediately dominates them. The result is that empty pronouns which are to be bound cannot be licensed since QPs do not c-command those pronouns. Thus we can explain the ungrammaticality of (43a, b).

Let us consider the sentences in (44), which undergo Scrambling. The LF-representations of (44) are as follows.

(53) a. [V' QP$_i$ [t$_i$ [V' [NP ...pronoun$_i$ ...]$_{j/i}$
[V' t$_i$ V]]]
b. [V' QP$_i$ [t$_i$ [V' NP [V' [ADV ...pronoun$_i$ ...]$_{j/i}$
[V' t$_i$ V]]]]

Unlike (52), QPs in (53) are adjoined to sentence initial positions at S-structure. So QPs c-command empty pronouns and license them as bound pronouns.

One problem is left unsolved as to (53). It is the point mentioned as a difference of slash-indexed elements between English and Japanese in (48) in 3.1. In (53) the traces left by Scrambling are c-commanded by slash-indexed elements. This configuration should lead to a referential hierarchy violation. But the fact is contrary.

Here we propose (54) and (55).

(54) Empty categories left by Scrambling
....NP-trace-like elements
Empty categories left by *Wh*-movement, QR
....true variables

(55) NP-traces are less referential than pronouns.

It seems plausible to distinguish traces left by Scrambling from those left by *wh*-movement and QR, since *wh*-movement and QR are operator movements while Scrambling is not. *Wh*-movement and QR are required to interpret *wh*-elements and QPs in a proper way. On the other hand, there's no trigger of Scrambling and it is optional. In addition, its application does not affect the meaning of a sentence. Note that (55) fits Lasnik's idea: NP-traces are always required to be bound by their antecedents, that is, they are always dependent upon other elements for their reference and hence less referential than pronouns. Although the claim that empty categories left by Scrambling are NP-traces has far-reaching consequences and implications which we will not adress here, it is in the same spirit as recent work on Scrambling in that it pursues the idea that Scrambling is a sort of A-movement.[9]

Given the assumption in (54) and (55), the contrast between Japanese and English under consideration is accounted for. In (53), the configuration of (44) at LF, the trace left by Scrambling is as referential as an NP-trace according to (54). Although this trace is c-commanded by slash-indexed NP, the relation between the binder and the bindee is legal with respect to the referential hierarchy, without any violation of (38). In other words, the contrast between the two languages is due to the difference of the character between traces left by *wh*-movement and those left by Scrambling.

Note that Topicalization in English behave differently from Scrambling in this respect and exhibits a crossover

effect as in (56).

(56) *Everyone$_i$, his$_i$ mother loves t$_i$ (Saito (1985))

Our analysis can explain this difference easily. The point is that Topicalization is an operator movement and leaves variables. So the LF representation of (56) with a slash-index is as follows:

(57) Everyone$_i$, [his$_i$ mother]$_{j/i}$ loves t$_i$

In (57) slash-index */i* on *his mother* binds variable *ti*, resulting in a violation of the referential hierarchy.

At this point, some explanation is necessary for (41e). Recall that we explained that (41e) is ungrammatical since *sono hito* A-binds the trace left by Scrambling, which is a variable. Obviously we can no longer appeal to this account since we claim that the trace is not a variable but an NP-trace. (58) is the LF representation of (41e).

(58) [dare$_i$-o [t$_i$' [sono hito$_i$-ga t$_i$
aishiteiru-no]]

We argue that another factor is at work here to make the sentence ungrammatical. Yuji Takano (personal communication) suggested to me that there is an obligatory reconstruction effect with respect to A, B, C conditions in Japanese.

(59) a. *[John-to Bill]$_i$-ga [otagai$_i$-no musuko-ni]$_j$
and NOM each other's sons
Mary-ga t$_j$ horeteiru to omotteiru
NOM loves that think
"[John and Bill]$_i$ think that Mary loves each other$_i$'s sons"

b. John thinks that himself$_i$, Mary likes t$_i$
(Lasnik & Saito (forthcoming))

Unlike Topicalization in English, Scrambling does not expand the binding domain and the Scrambled element seems to undergo reconstruction before the binding conditions apply. If it is correct, the Scrambled element *dare-o* in (41e) is also reconstructed at the revel where the binding conditions are relevant, resulting in the following configuration.

(60) sono hito$_i$-ga dare$_i$-o aishiteiru-no

Suppose that QPs like *dare* are treated as R-expressions within Condition C. Then it follows that the representaiton in (60) violates Condition C, since *sono hito* binds *dare*. Thus (41e) is ruled out for independent reasons.

4. Conclusion

In this paper, I proposed a licensing condition of bound pronouns. In so doing, I showed that the mechanism of slash-indexing adopted by Stowell and the condition proposed by Lasnik played crucial roles. I also presented a possibility to explain Japanese crossover phenomena under the same condition.

NOTES

* I would like to thank Minoru Nakau, Yukio Hirose, Toshifusa Oka, Yuji Takano, Shinsuke Homma, Hidehito Hoshi for valuable comments and suggestions. Needless to say, all remaining inadequacies are my own.

1. Abe(1990) and Oka (personal communication) point out that the pronouns in (7a, b) are not true variables but some sort of E-type pronouns (Cf. Evans (1980)), and they develop insightful analyses. In this paper, I will take those pronouns as semantic variables and not as E-type pronouns, following Stowell's analysis.

2. Note that neither the Bijection Principle proposed by Koopman and Sportiche nor the Parallelism Constraint on Operator Binding by Safir can elucidate the fact in (7)-(9).

i) The Bijection Principle (Koopman & Sportiche(1982))
There is a bijective correspondence between variables and A'-positions.

ii) The Parallelism Constraint on Operator Binding(PCOB) (Safir(1984))
If O is an operator and x is a variable bound by O, then for any y, y a variable bound by O, x and y are [α pronominal].

The Bijection Principle requires a one-to-one relation between an operator and a variable. Clearly, the sentences in (7)-(9) violate this principle, but they are completely grammatical. The constraint in (ii) also predicts (7)-(9) to be ungrammatical since operators binds both the pronouns and the variables simultaneously. But the fact is the opposite. So some different approach needs to be taken, if one wants to explain the argument/adjunct asymmetry illustrated above.

3. The examples in (25) are ungrammatical, in a similar way in which the examples in i) are ungrammatical. Safir notes that i) is less acceptable than (25). I suggest this is because QPs take scope over the pronouns in (25) and (26),

while the pronouns in i) are out of the scope of QPs.

i)a. *[Hisi mother]j knows whoi Mary saw ti
b. *[Hisi mother] claims that everyonei is guilty

4. I thank Yuji Takano (personal communication) for bringing Lasnik's work into my attetion.

5. If we assume that all the categories which contain the elements referèntially dependent on other elements bear slash-indices, we cannot explain the grammaticality of (ib) and (iib). (ic) and (iic) are the LF representations.

PRO-gate

i)a. *Hisi washing hisi car pleased everyonei
b. PROi washing hisi car pleased everyonei
c. [[PROi washing hisi car]/i [everyonei [pleased ti]]]

Parasitic Gaps in Subject Position

ii)a. *Whoi did [Mary's picture of him] annoy ti
b. ?Whoi did [Mary's picture of ei] annoy ti
c. [whoi did [Mary's picture of ei]/i annoy ti

At present I have no elaborate accounts of these fact, but it seems to be the case that the control theory and the mechanism of chain composition are concerned with the grammaticality of these sentences.

6. Before going into the details, I have a point to mention about the characteristics of Japanese ponoun *kare*. As is often said (cf. Hoji (1985)), *kare* cannot function as a bound pronoun even if all the necessary conditions are satisfied.

i) darei-ga [Mary-ga *karei-o/ sono hitoi -o/proi yobu
whoi NOM NOM hei ACC the personi ACC call

mae -ni] kita-no
before PostP came Q
Who$_i$ came before Mary called him$_i$/the person$_i$/pro$_i$

In (i) *kare* cannot be bound though it is c-commanded by QP *dare*, while *sono hito* and *pro* can be. In the following discussion, instead of an overt pronoun *kare*, we examine sentences involving *sono hito* and empty pronouns, which can be interpreted as bound if the conditions are met.

7. The same effect is observed in German and Hindi.

German

i)a. ?dass seine$_i$ Mutter jeden$_i$ mag
that his mother everyone likes

b. ?dass seine$_i$ Mutter den MAX$_i$ mag (capitals=focus)
that hus mother the MAX likes

ii)a. dass jeden$_i$ seine$_i$ Mutter mag

b. dass den MAX$_i$ seine$_i$ Mutter mag (Haider (1989))

The sentences in (i) exibit weak crossover effects. But (ii), where quantified phrases undergo Scrambling, are grammatical. As for Hindi examples, see Mahajan (1988).

8. One might claim that *wh*-phrases must move to Q-morphemes *ka* in LF. But I claim that it is not necessary. Just co-indexing between *wh*-phrases and Q-mophemes is sufficiant to license *wh*-elements and to guarantee their scopes.

It is not unreasonable to claim this, once we note differences between English and Japanese pointed out in Fukui (1986): English has overt complementizers and movement of *wh*-phrases at S-structure is obligatory unless other principles of grammar prevent it, while it is unclear whether Japanese has complementizers and obviously there is no overt syntactic *wh*-movement in Japanese. All that QPs in Japnese have to do is to avoid vacuous quantification in LF and to indicate their scopes in some way. Co-indexing is a

promising candidate. Surely, co-indexing between *wh*-elements and Q-morphemes may require some locality condition but it is beyond the scope of this article and we leave it to further research.

9. Mahajan (1988), on the basis of data from Hindi, propose that Scrambling be a movement forced for Case reasons, the landing site of the rule being A-position. Miyagawa (1990) argues, extending Mahajan's proposal, that Japanese Scrambling is also a movement to an A-position.

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